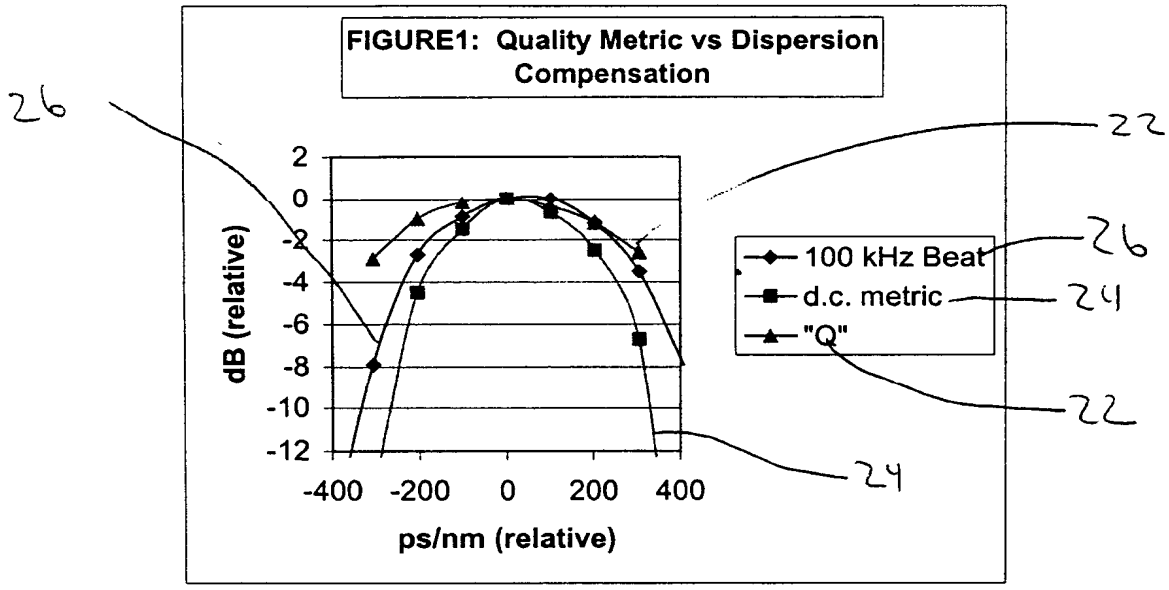
FIGURE1: Quality Metric vs Dispersion Compensation
dB (relative)
2
0
-2
-4
-6
-8
-10
-12
-400
-200
0
200
400
ps/nm (relative)
100 kHz Beat
d.c. metric
"Q"
26
22
24

FIGURE 1

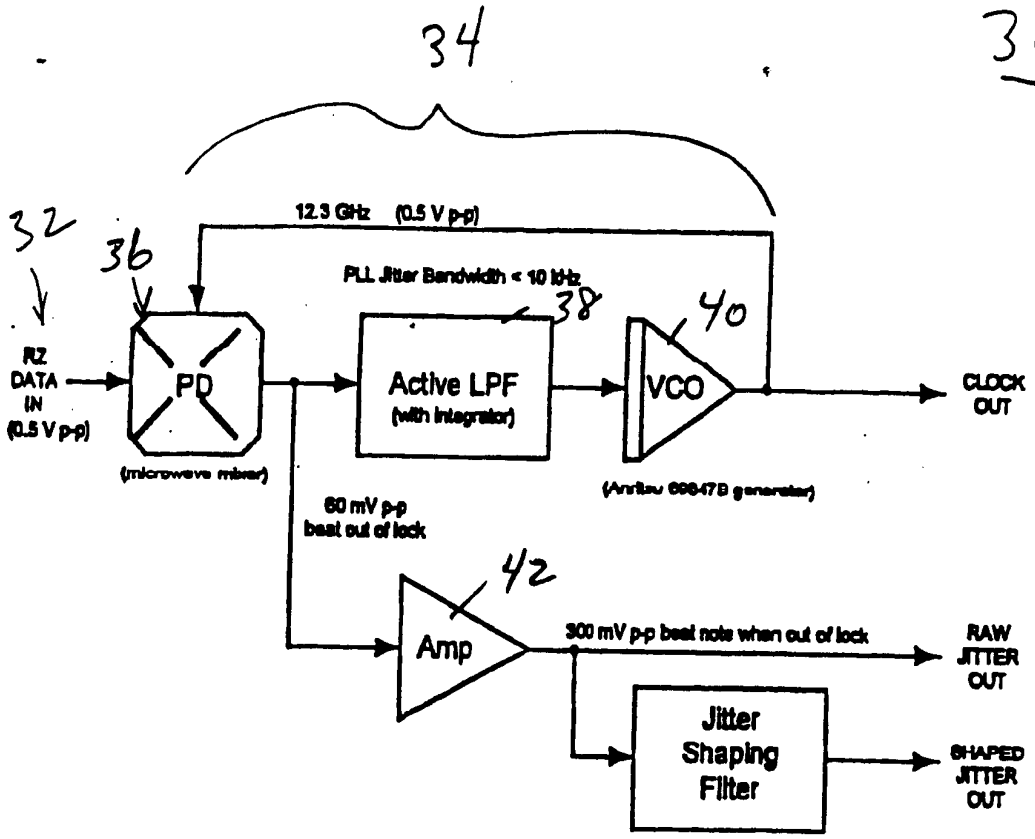
34
30
32
36
12.3 GHz (0.5 V p-p)
PLL Jitter Bandwidth < 10 kHz
38
40
RZ DATA IN (0.5 V p-p)
PD
(microwave mixer)
Active LPF (with integrator)
VCO
(Anritsu 68347B generator)
CLOCK OUT
60 mV p-p beat out of lock
42
Amp
300 mV p-p beat note when out of lock
RAW JITTER OUT
Jitter Shaping Filter
SHAPED JITTER OUT
44

FIGURE 2

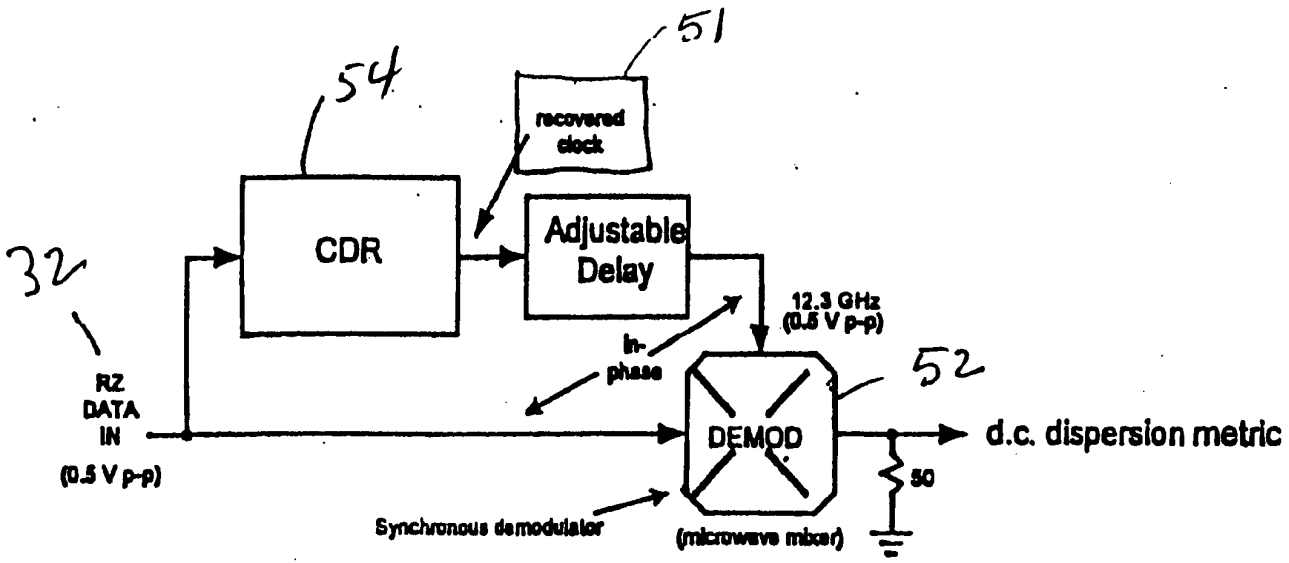
54
51
recovered clock
CDR
Adjustable Delay
32
12.3 GHz (0.5 V p-p)
In-phase
52
RZ DATA IN
(0.5 V p-p)
DEMOD
d.c. dispersion metric
50
Synchronous demodulator
(microwave mixer)

FIGURE 3

60

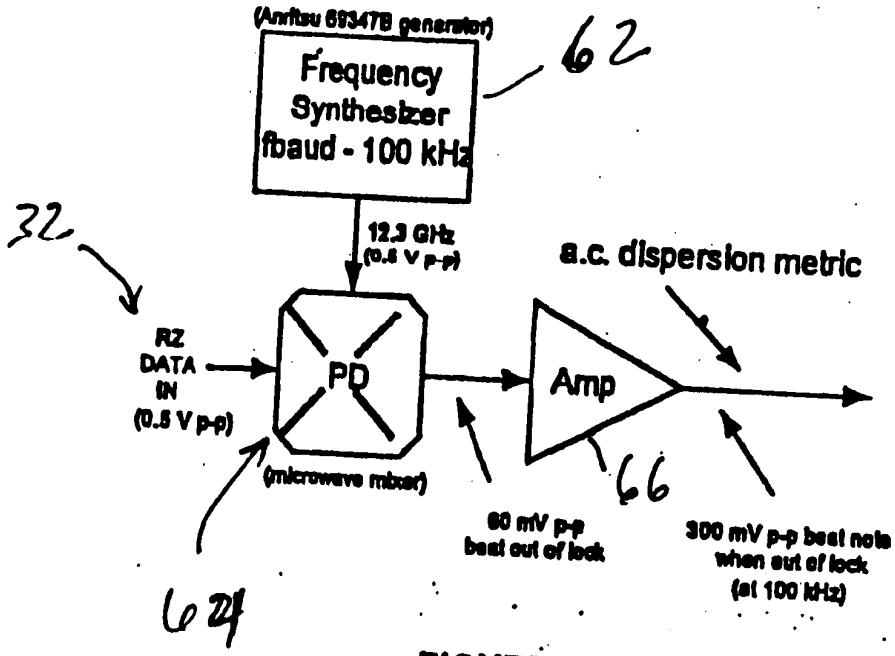
(Anritsu 69347B generator)
Frequency Synthesizer fbaud - 100 kHz
62
32
12.3 GHz (0.5 V p-p)
a.c. dispersion metric
RZ DATA IN (0.5 V p-p)
PD
Amp
(microwave mixer)
66
60 mV p-p beat out of lock
300 mV p-p beat note when out of lock (at 100 kHz)
64

FIGURE 4

70

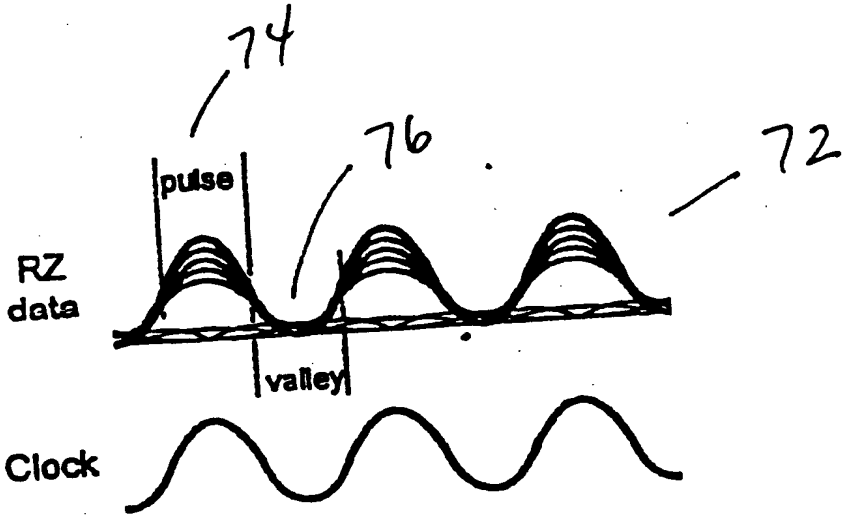

FIGURE 5

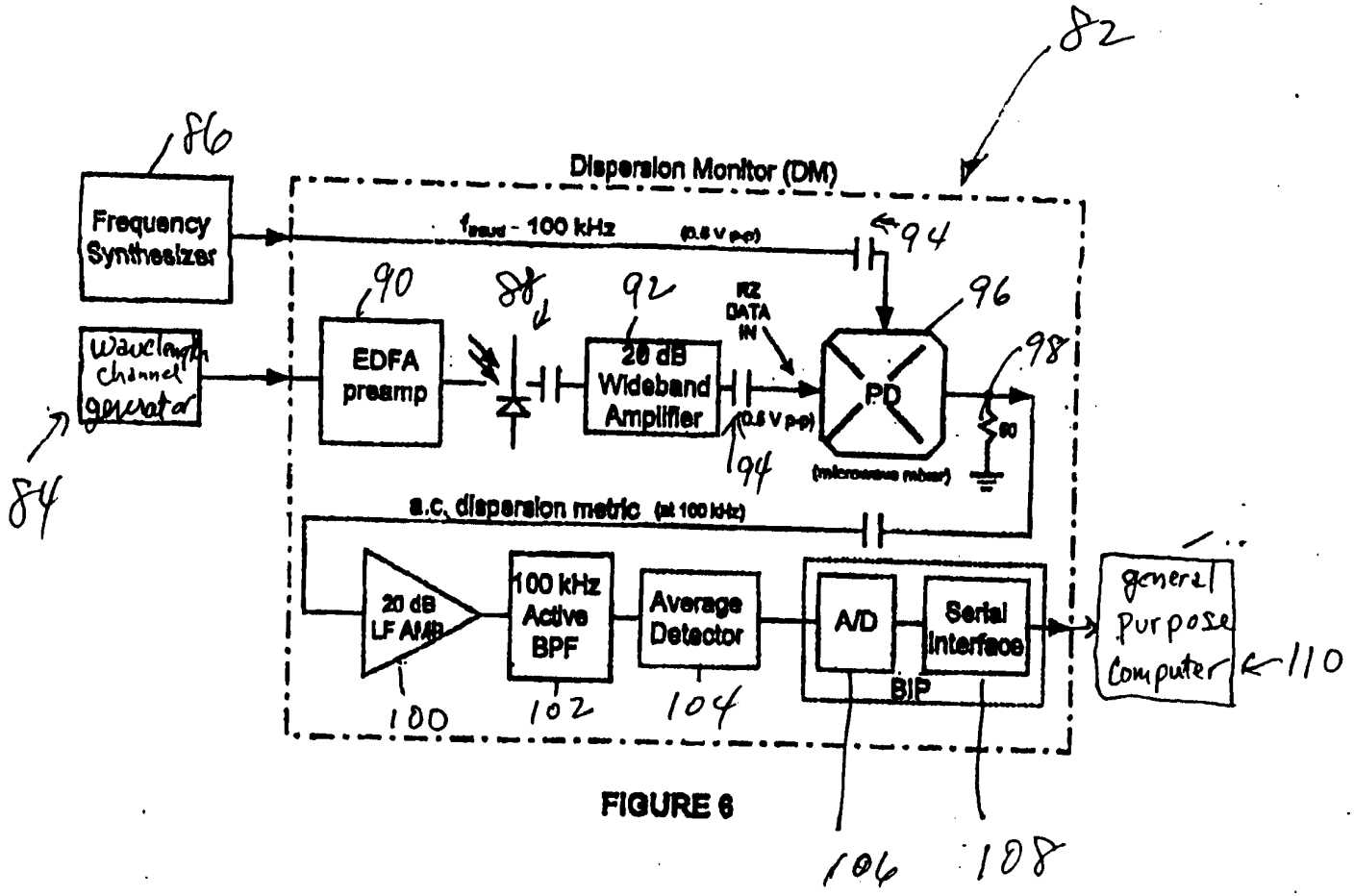
80
82
86
Dispersion Monitor (DM)
Frequency Synthesizer
100 kHz
94
90
88
92
RZ DATA IN
96
98
Wavelength channel generator
EDFA preamp
20 dB Wideband Amplifier
PD
84
94
a.c. dispersion metric
20 dB LF Amp
100 kHz Active BPF
Average Detector
A/D
Serial Interface
BIP
general purpose computer
110
100
102
104
106
108

FIGURE 6

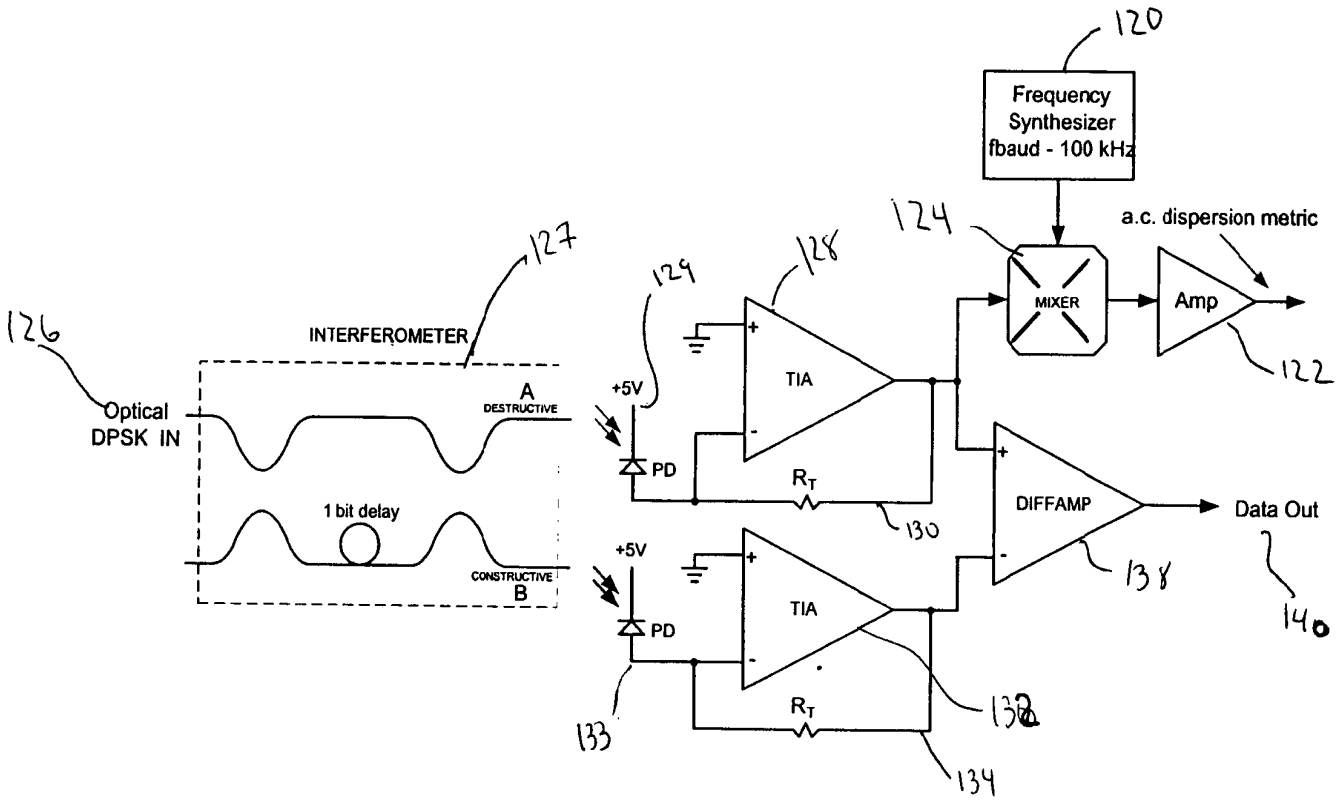
120
Frequency Synthesizer fbaud - 100 kHz
124
a.c. dispersion metric
MIXER
Amp
122
126
127
INTERFEROMETER
Optical DPSK IN
A
DESTRUCTIVE
1 bit delay
CONSTRUCTIVE
B
129
128
+5V
PD
TIA
R_T
130
DIFFAMP
Data Out
138
140
+5V
PD
TIA
R_T
133
132
134

FIGURE 7

Traditional PLL (phase-locked loop) Circuit with Error signal to VCO disabled

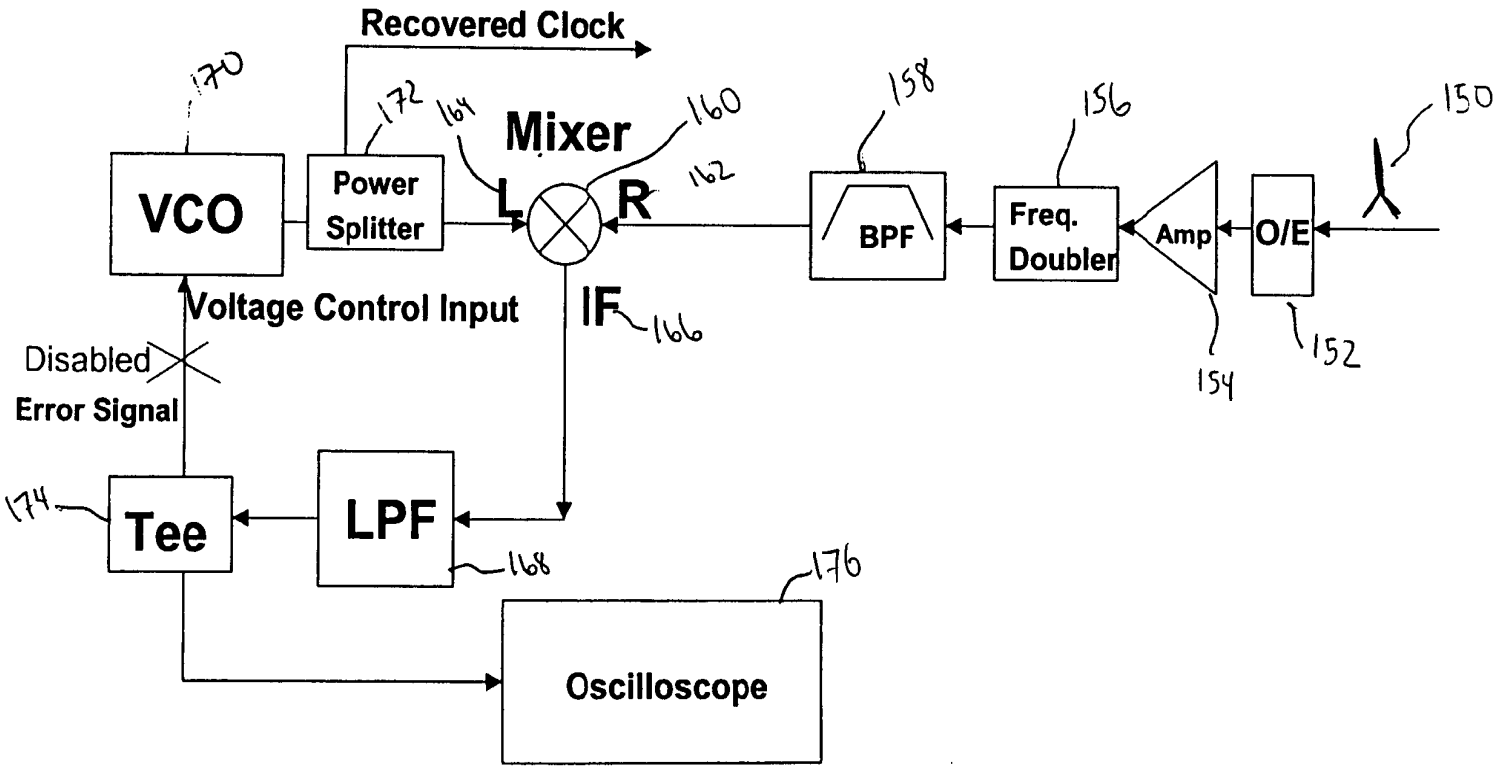

Figure 8

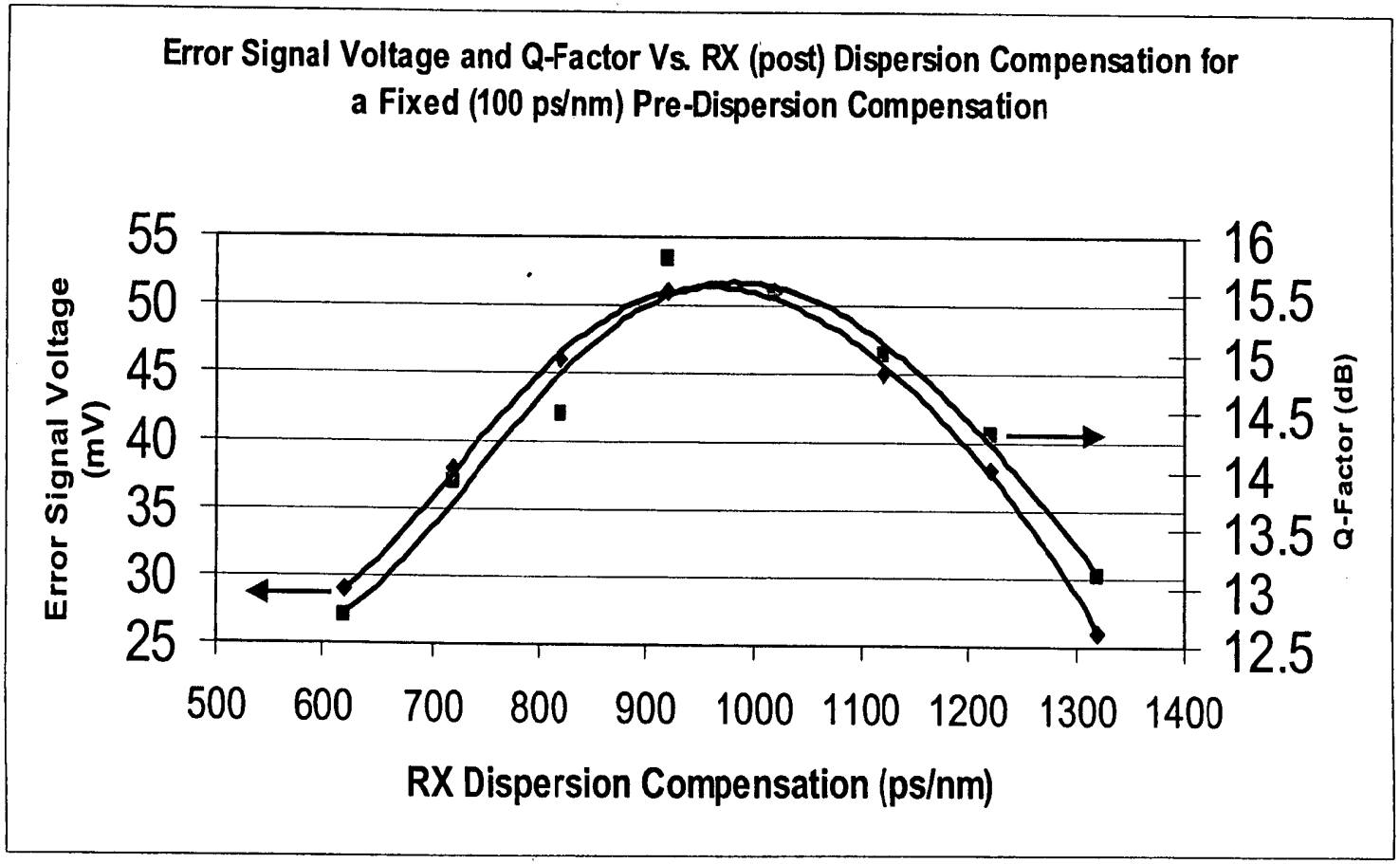
Error Signal Voltage and Q-Factor Vs. RX (post) Dispersion Compensation for a Fixed (100 ps/nm) Pre-Dispersion Compensation
Error Signal Voltage (mV)
55
50
45
40
35
30
25
16
15.5
15
14.5
14
13.5
13
12.5
Q-Factor (dB)
500
600
700
800
900
1000
1100
1200
1300
1400
RX Dispersion Compensation (ps/nm)

Figure 9